

## Asian Dust and Ocean EcoSystem (ADOES): a recently approved task team of SOLAS

Huiwang Gao<sup>1</sup>, Xiaohong Yao<sup>1</sup> and Uematsu Mitsuo<sup>2</sup>

<sup>1</sup>Key Laboratory of Marine Environment and Ecology (Ocean University of China), Ministry of Education, Qingdao, P.R. China

<sup>2</sup>Atmosphere and Ocean Research Institute, The University of Tokyo, Kashiwanoha, Kashiwa, Chiba, Japan. Contact: mailto:hwgao@ouc.edu.cn



The formation of the ADOES Task Team was initially proposed at the SOLAS Open Science Conference in Halifax in 2004. From 2005 to 2009, four international workshops were held in China and Korea to address the scientific objectives. The scope of ADOES includes studies on Asian dust, especially the transport path, deposition flux, bioavailability and its comprehensive effects on ocean ecosystems. In the next 5 to 10 years ADOES will focus on scientific issues related to the 3 SOLAS foci as outlined in the Science Plan and Implementation Strategy ([www.solas-int.org/sciplanis.html](http://www.solas-int.org/sciplanis.html)), in particular activities 1.4 - Iron and marine productivity, 1.5 - Ocean-atmosphere cycling of nitrogen, 2.1 - Exchange across the air-sea interface and 3.3 - Air-sea flux of N<sub>2</sub>O and CH<sub>4</sub>.

The key themes of ADOES are: physical and chemical variations of dust aerosols during transport; transport path and layer of dust and its deposition flux to the marginal seas and the North Pacific; impacts and feedback of dust on biogeochemistry and ocean ecosystem. SOLAS officially acknowledged ADOES as a task Team in Jan 2010.

### New funded projects

- “Response of marine ecological systems in the marginal seas to open ocean of the western North Pacific to climate change” was funded for 2010-2012 by the Strategic Japanese-Chinese Cooperative Program on “Climate Change”. The 1st METMOP (Marine Ecosystem Transit from Marginal seas to Open Pacific) Workshop (the kick off meeting of this joint program) was held on March 4-5, 2010 at Ocean Research Institute, the University of Tokyo, Japan.

PI: Gao Huiwang (Ocean University of China, China) and Uematsu Mitsuo (the University of Tokyo, Japan).

- “Biogeochemical impacts of Asian Dust on the North Pacific Ecosystem and Climate (BIAD)” was funded for 2009-2011 under the 1st Québec - Ministry of Science and Technology of the P.R.China joint call for proposals for science and technology cooperation.

PI: Maurice Lavoie (Laval University, Canada) and Yang Guipeng (Ocean University of China, China)

- Proposal to WESTPAC (IOC Sub-Commission for the Western Pacific) for a working group of ADOES was tentatively supported in the WESTPAC-VIII meeting 2010 in Bali, Indonesia. Potential funding injections for meetings and workshops within regional and international communities are expected.

### Upcoming events

- The 5th ADOES workshop with Asian SOLAS symposium will be held on 28 November – 3 December 2010 in Nagasaki Japan, sponsored by the Sino-Japan joint program and Nagasaki University. The theme of this workshop is the comparative study on Asian dust and oceanic ecosystems between coastal and open oceans.
- A special session proposal “Linkages in Biogeochemical Cycles between the Surface Ocean and Lower Atmosphere over the Pacific Ocean” was submitted for the 2010 AGU Fall Meeting at San Francisco, on December 13–17, 2010.
- ADOES will make great effort on the following scientific issues based on the recommendations from the Discussion Session Reports at the SOLAS Open Science Conference 2009 and comments from the participants at the 4th ADOES workshop 2009, including: the uniqueness of Asian dusts to oceans; input of dust and its response/feedbacks under changing environments; standardised experimental protocol (e.g. onboard incubation techniques with dust) development to allow comparison between the different dust sources and oceanic region/basins; evaluation of potential effects of dust deposition on water turbidity and macro-nutrient deposition; comparative studies between HNLC, LNLC and eutrophication coastal waters.

### Recent publications

Mårtensson, E.M., Nilsson, E.D., et al. (2003). Laboratory simulations and parameterization of the primary marine aerosol production. *J. Geophys. Res.* 108 (D9) (4297).

Shi, J., Gao, H., et al. (2010). Sources, compositions and distributions of water-soluble organic nitrogen in aerosols over the China Sea, *J. Geophys. Res.* doi:10.1029/2009JD013238, In Press.

Yang, J., Zhang, G-L., et al. (2009). Seasonal variation of fluxes and distributions of dissolved methane in the North Yellow Sea, *Cont. Shelf Res.* 30 (2): 187-192 doi:10.1016/j.csr.2009.10.016.

Matsumoto, K., Minami, H., et al. (2009). Size partitioning of particulate inorganic nitrogen species between the fine and coarse mode ranges and its implication to their deposition on the surface ocean, *Atmos. Environ.* 43: 4259–4265.

Uematsu, M., Hattoria, H., et al. (2010). Atmospheric transport and deposition of anthropogenic substances from the Asia continent to the East China Sea, *Marine Chem.* 120: 108–115, doi:10.1016/j.marchem.2010.01.004.

Uno, I., Eguchi, K., et al. (2009). Asian dust transported one full circuit around the globe, *Nature Geosci.* 2: 557 – 560, doi: 10.1038/NAGE0583.

Ooki, A., J. Nishioka, T., et al. (2009). Size dependence of iron solubility of Asian mineral dust particles, *J. Geophys. Res.* 114: D03202 doi:10.1029/2008JD010804.

Tan S., Shi G., et al. (2010). Correlation of Asian dust with chlorophyll and primary productivity in the coastal seas of China during the period from 1998 to 2008. Submitted to *J. Geophys. Res.*